

Docket No.: 020732-97.668 (7493)
Appl. No. 10/792,038

Section II. (REMARKS)

The claims pending herein are 1-2, 4-15, 17-23, 53-57, and 59.

Allowable Subject Matter

In the November 24, 2006 Office Action, the Examiner objected to part A¹ of claim 7 and claim 57 as being dependent upon a rejected base claim and indicated that they would be found allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants acknowledge same.

Provisional Double Patenting Rejection Under the Judicially Created Doctrine of Obviousness-Type Double Patenting

In the November 24, 2006 Office Action, the Examiner provisionally rejected claims 8-9, 11-13, 22, 37-38, 40-42 and 51 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7, 9-17, 21-22, and 33-48 of co-pending U.S. Patent Application No. 10/389,214. Applicants acknowledge same.

According to MPEP 804 (D)(B)(1):

“If the [obviousness-type double patenting] rejection is the only rejection remaining in the later-filed application, while the earlier-filed application is rejectable on other grounds, a terminal disclaimer must be required in the later-filed application before the rejection can be withdrawn.”

It is noted that the earlier co-pending application, U.S. Patent Application No. 10/389,214, which presently pending claims 8-9, 11-13, 22, 37-38, 40-42 and 51 are provisionally rejected under, is still pending.

If in the future, co-pending U.S. Patent Application No. 10/389,214 remains rejectable on other

¹ according to the Examiner, part A corresponds to the elected Formula G subspecies.

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grounds, the obviousness-type double patenting rejection is the only rejection remaining to the presently pending case AND the presently pending claims are an obvious variation of the invention defined in claims 1-7, 9-17, 21-22, and 33-48 of co-pending U.S. Patent Application No. 10/389,214 (which can only be objectively assessed when the only rejection remaining in the presently pending case is the obviousness-type double patenting rejection), applicants will submit the required terminal disclaimer.

Evidence Required to Establish Common Ownership

Applicants hereby declare and affirm that U.S. Patent Application Publication No. 2004/0180300, filed on March 14, 2003 in the name of Minsek et al., claiming priority to U.S. Provisional Patent Application No. 60/434,971 filed on December 20, 2002, and having an earliest publication date of September 16, 2004, was, at the time the invention of U.S. Application Serial No. 10/792,038 (the presently pending application) was made, owned by Advanced Technology Materials, Inc.

Request for Rejoinder Reminder

Applicants respectfully request rejoinder of method claims 24-31, 33-52 and 58 upon allowance of the composition claims 1-2, 4-15, 17-23, 53-57, and 59. Towards that end, withdrawn method claims 24, 38, 43-45, and 52 have been amended in a manner consistent with the pending composition claims.

Amendment to claims 1, 8, 14 and 15

Claim 1 has been amended to include the limitations of claim 7 and previously pending claims 13 and 15.

Claim 8 has been amended to include a limitation of claim 23.

Claims 14 and 15 have been amended to include limitations in claim 7.

Rejection of Claims and Traversal Thereof

In the November 24, 2006 Office Action:

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claims 8-9, 11-13, and 22 were rejected under 35 U.S.C. 102(e) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over Minsek et al. (U.S. Patent Application Publication No. 20040180300);

claims 8-9, 11-13, and 22 were rejected under 35 U.S.C. 102(a) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over Skee (U.S. Patent No. 6,599,370);

claims 1-2, 4-6, 10, 14-21, 23, 53-56, and 59 were rejected under 35 U.S.C. §102(a) as anticipated by, or, in the alternative under 35 U.S.C. §103(a) as being unpatentable over Skee in view of En et al. (U.S. Patent Application Publication No. 20040134682), Yokoi et al. (U.S. Patent Application Publication No. 20050106492) and Moore (U.S. Patent No. 6,551,973);

claims 1-6 were rejected under 35 U.S.C. 102(b) as being anticipated by Carati et al. (U.S. Patent No. 5,908,968); and

claims 1-5 and 10 were rejected under 35 U.S.C. 102(a) as being anticipated by Miller et al. (U.S. Patent No. 6,572,743).

These rejections are traversed and reconsideration of the patentability of the pending claims is requested in light of the following remarks.

Rejection under 35 U.S.C. §§ 102, 103 in view of Minsek

1. In the November 24, 2006 Office Action, claims 8-9, 11-13, and 22 were rejected under 35 U.S.C. 102(e) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over Minsek et al. (U.S. Patent Application Publication No. 20040180300) (hereinafter Minsek). Applicants traverse such rejections.

Claim 8 has been amended herein to recite:

"A cleaning composition including an active cleaning combination (ACC) and dinonylphenol ethoxylate, wherein said ACC consists of a strong base in combination with an oxidant and said cleaning composition is useful for removing

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photoresist and/or sacrificial anti-reflective coating (SARC) materials from a substrate having such material(s) thereon."
(emphasis showing added limitation(s))

It is well established, as a matter of law, that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

Minsek does not expressly or inherently disclose a composition including dinonylphenol ethoxylate. Accordingly, Minsek does not anticipate applicants' claim 8, and claims 9, 11-13 and 22 depending therefrom.

As stated hereinabove, Minsek, which qualifies as a §102(e) reference, was commonly owned by Advanced Technology Materials, Inc. at the time of filing of the present application. Consistent with the provisions of MPEP §706.02(I)(2), the statement hereinabove by applicants disqualifies U.S. Patent Application Publication No. 2004/0180300 to Minsek from being used in a rejection under 35 U.S.C. §103(a) against claims of the present application. See also, MPEP §§ 706(I)(1).

In conclusion, Minsek does not anticipate applicants' claims 8-9, 11-13, and 22 and is not available as prior art for a rejection based on obviousness. Withdrawal of the §§ 102, 103 rejections in view of Minsek is respectfully requested.

Rejection under 35 U.S.C. §§ 102, 103 in view of Skee

1. In the November 24, 2006 Office Action, claims 8-9, 11-13, and 22 were rejected under 35 U.S.C. 102(a) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over Skee (U.S. Patent No. 6,599,370). Applicants traverse such rejection.

Skee relates to aqueous alkaline compositions useful in the microelectronics industry for stripping or cleaning semiconductor wafer substrates by removing photoresist residues and other unwanted contaminants. The Skee compositions include one or more metal ion-free bases in sufficient amounts to produce a pH of about 10-13 and at least one bath stabilizing agent. The Skee compositions may also include a suitable amphoteric, non-ionic, anionic or cationic surfactant.

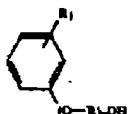
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As indicated hereinabove, applicants' claim 8 has been amended herein to recite a composition that includes dinonylphenol ethoxylate. Notably, Skee does recite that the surfactant may be a polyoxyethylene (POE) monoalkyl ether, however, Skee does not expressly or inherently disclose a composition including dinonylphenol ethoxylate.²

According to the MPEP §2131.02, when the compound is not specifically named . . . anticipation can only be found if the classes of substituents are sufficiently limited or well delineated. *Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990).

Notably, the polyoxyethylene (POE) monoalkyl ether surfactant subgenus is rather extensive, as introduced, in part, in U.S. Patent No. 5,258,136 in the name of Smith et al. (see Abstract).³

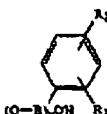
Novel phenol compounds of the formula:



FORMULA A

wherein R₂ is an alkyl substituent of from 8 to 18 carbon atoms, R₁ is an ethyl or propyl substituent, and n is from about 50 to 200.

These compounds as well as certain other similarly alkoxylated compounds, for example, a compound of the formula:



FORMULA B

dinonylphenol ethoxylate
is represented by
Formula B

wherein R₂ and R₃ are each, independently, an alkyl substituent of 8 to 18 carbon atoms, R₁ is an ethyl or propyl substituent, and n is from about 50 to 200, may be used in sodium stearate based stick gels to enhance transparency, minimize syneresis and/or increase the setting point of the gel.

In other words, Smith et al. discloses at least 17 different POE monoalkyl ether compounds.

The POE monoalkyl ether subgenus also includes monoalkyl substituents that do not have a phenyl group, i.e., saturated or unsaturated monoalkyls such as POE caprylyl ether, POE nonyl ether, POE decyl ether, POE undecyl ether, POE lauryl ether, POE tridecyl ether, POE myristyl ether, POE pentadecyl ether, POE cetyl ether, POE heptadecyl ether, POE stearyl ether, POE

² dinonylphenol ethoxylate is synonymous with POE dinonyl phenyl ether and dinonylphenol polyoxyethylene, which all have CAS No. 9014-93-1.

³ Smith et al. relates to sodium stearate cosmetic gel stick formulations and is included herein to evidence the large number of possible molecules in the POE monoalkyl ether subgenus.

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oleyl ether, etc.

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Turning to the present case, the polyoxyethylene monoalkyl ether subgenus is not sufficiently limited and as such, the subgenus cannot anticipate the dinonylphenol ethoxylate species. Accordingly, Skee does not anticipate applicants' claim 8, and claims 9, 11-13 and 22 depending therefrom.

With regards to obviousness, Skee does recite that the surfactant may be a polyoxyethylene monoalkyl ether (see, Skee, col. 9, lines 17-64, as reproduced hereinbelow). That said, Skee also recites no less than 40 other possible surfactant subgenus's.

Amphoteric surfactants useful in the compositions of the present invention include betaines and sulfobetaines such as alkyl betaines, amidobetaines, alkyl sulfobetaines and amidobetaine sulfobetaines; amminocarboxylic acid derivatives such as amphoglycinates, amphopropionates, amphodiglycinates, and amphodipropionates; iminodicids such as alkoxalkyl iminodicids or alkoxalkyl iminodiacids; cationic oxides such as alkyl amine oxides and alkylamido alkylamine oxides; fluorooalkyl sulfonates; and fluorinated alkyl amphoteric and mixtures thereof.

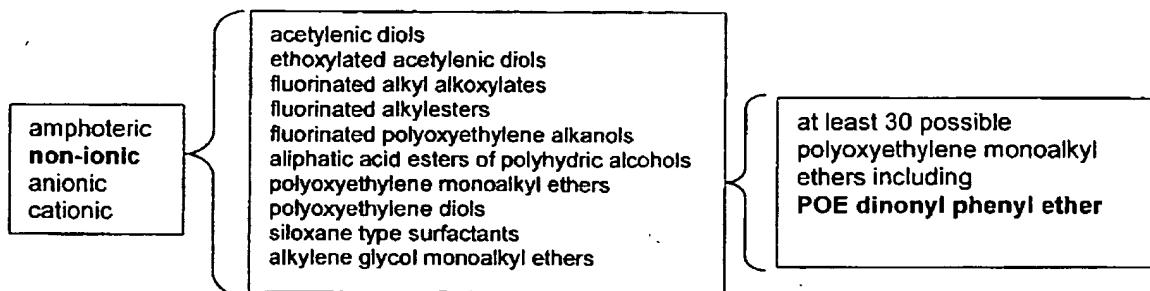
Preferably, the amphoteric surfactants are cococomidopropyl betaine, cococomidopropyl dimethyl betaine, cococomidopropyl hydroxy betaine, caprylomimidopropionate, cococomidopropionate, cococomphopropionate, cococomphohydroxymethyl propionate, isodecylhypropyltrimonium dipropionic acid, laurylimidopropionate, cococomidopropylamine oxide and cocosulfuric oxide and fluorinated alkyl amphoteric.

Non-ionic surfactants useful in the compositions of the present invention include acetylenic diols, ethoxylated acetylenic diols, fluorinated alkyl ethoxylates, fluorinated alkylesters, fluorinated polyoxyethylene alkyls, aliphatic acid esters of polyhydrocyclic acids, polyoxyethylene monalkyl ethers, polyoxyethylene diols, siloxane type surfactants, and alkylene glycol monoalkyl ethers. Preferably, the non-ionic surfactants are acetylenic diols or ethoxylated acetylenic diols.

Anionic surfactants useful in the compositions of the present invention include carboxylates, N-acylcarboxylates, sulfonates, sulfates, and mono and diesters of orthophosphoric acid such as decyl phosphate. Preferably, the anionic surfactants are metal-free surfactants.

Cationic surfactants useful in the compositions of the present invention include amine oxides, dialkyldimethylammonium salts, dialkylmorpholinium salts, alkylbenzyltrimethylammonium salts, alkyltrimethylammonium salts, and alkylpyridinium salts. Preferably, the cationic surfactants are halogen-free surfactants.

For applicants' claim 8 to be non-obvious in view of Skee, there has to be some motivation, teaching or suggestion in Skee to (a) select the non-ionic surfactant from a list of four broad surfactant genus's, (b) select the subgenus polyoxyethylene monoalkyl ethers from the extensive list of other non-ionic surfactants, and thereafter (c) select polyoxyethylene dinonyl phenyl ether from a list of no less than 30 possible polyoxyethylene monoalkyl ethers.⁴

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According to MPEP §2144.08, entitled "Obviousness of Species When Prior Art Teaches Genus," the prior art must provide some motivation to one of ordinary skill in the art to make the claimed invention in order to support a conclusion of obviousness. See, e.g., *In re Vaeck*, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). In other words, to establish a *prima facie* case of obviousness, the Examiner must show where, *in Skee*, is the motivation, teaching or suggestion to select dinonylphenol ethoxylate from the surfactant genus (i.e., non-ionic), and the POE monoalkyl ether subgenus.

In conclusion, Skee does not anticipate or motivate, teach or suggest applicants' claim 8, and claims 9, 11-13 and 22 depending therefrom. Withdrawal of the §§ 102, 103 rejections in view of Skee is respectfully requested.

2. In the November 24, 2006 Office Action, claims 1-2, 4-6, 10, 14-21, 23, 53-56, and 59 were rejected under 35 U.S.C. §102(a) as anticipated by, or, in the alternative under 35 U.S.C. §103(a) as being unpatentable over Skee in view of En et al. (U.S. Patent Application Publication No. 20040134682) (hereinafter En), Yokoi et al. (U.S. Patent Application Publication No. 20050106492) (hereinafter Yokoi) and Moore (U.S. Patent No. 6,551,973). Applicants traverse such rejection.

Claim 1 has been amended to recite:

"A cleaning composition including a quaternary base, at least one alkali or alkaline earth base, and at least one additional component selected from the group consisting of a chelator, an oxirane species, and combinations thereof,

⁴ Formula A – C₈-C₁₈; Formula B – C₈-C₁₅; POA monoalkyl ethers without the phenyl group – C₈-C₂₀.

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wherein said chelator comprises a species selected from the group consisting of: 1-amino-1,2,4-triazole; 1-amino-1,2,3-triazole; 1-amino-5-methyl-1,2,3-triazole; 3-amino-1,2,4-triazole; 3-mercaptop-1,2,4-triazole; 3-isopropyl-1,2,4-triazole; naphthotriazole; 2-mercaptopbenzimidazole; 2-mercaptopbenzothiazole; 5-aminotetrazole; 5-amino-1,3,4-thiadiazole-2-thiol; 2,4-diamino-6-methyl-1,3,5-triazine; thiazole; triazine; methyltetrazole; 1,3-dimethyl-2-imidazolidinone; 1,5-pentamethylenetetrazole; 1-phenyl-5-mercaptotetrazole; diaminomethyltriazine; mercaptobenzothiazole; imidazoline thione; 4-methyl-4H-1,2,4-triazole-3-thiol; 5-amino-1,3,4-thiadiazole-2-thiol; benzothiazole; tritolyl phosphate; indiazole; adenine; thioglycerol; salicylamide; iminodiacetic acid; benzoguanamine; melamine; thiocyanuric acid; antranilic acid; 3-mercaptopropanol; and combinations thereof, and said cleaning composition is useful for removing photoresist and/or sacrificial anti-reflective coating (SARC) materials from a substrate having such material(s) thereon." (emphasis showing added limitation(s))

Skee does not expressly or inherently disclose the use of an oxirane species and/or the specifically enumerated chelators. According, Skee does not anticipate applicants' claim 1 or claims depending therefrom. Withdrawal of the rejection of claims 1-2, 4-6, 10, 14-21, 23, 53-56, and 59 as being anticipated by Skee is respectfully requested.

With regards to obviousness, there is no motivation, teaching or suggestion in Skee to include the oxirane species and/or the specifically enumerated chelators. Accordingly, two of the requirements needed to establish a *prima facie* case of obviousness have not been met.⁵ The Examiner is respectfully reminded that in order to make a legally sufficient rejection under 35 U.S.C. §103(a) based on a modification of a reference disclosure, the Examiner must explain with specificity what areas of the reference suggest the modification. *Ex parte Humphreys*, 24 U.S.P.Q.2d 1255, 1262 (B.P.A.I. 1992).

The inclusion of En, Yokoi and Moore does not cure the deficiency of Skee for the following reasons.

En relates to a process for manufacturing multilayer printed circuit boards. The only teaching

⁵ Specifically, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference teachings, and the prior art reference must teach or suggest all the claim limitations

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relating to chelating agents in En is at paragraphs [0248]-[0256] whereby a copper surface is roughened using a cupric azole complex and an organic acid. It is noted that En does not motivate, teach or suggest applicants' oxirane species and/or specifically enumerated chelators.

There can be no motivation, teaching or suggestion to combine Skee and the chelating agent teaching in En because Skee would be rendered unsatisfactory for its intended purpose. As such, a *prima facie* case of obviousness does not exist. See *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

As indicated, the lone teaching in En relating to the use of chelators relates to a composition for etchingly roughening a copper surface (as indicated in the chemical reactions provided in paragraph [0250] of En). In contrast, the method of Skee is described as removing "unwanted metallic and organic contaminants but does not cause unacceptable corrosion to . . . copper, . . . film" (see Skee, col. 13, lines 33-38). These are mutually exclusive teachings – Skee doesn't want the copper etched during cleaning while En is purposely removing copper. Clearly the combination of Skee and En would render Skee unsatisfactory for its intended purpose and as such, there can be no motivation or suggestion to combine Skee and En.

With regards to Yokoi, Yokoi relates to a photoresist stripping solution having a pH value of 3.5 to 5.5. As a reminder, Skee relates to a composition having a pH in a range from 10-13. Importantly, Yokoi recites that stripping solutions having an alkaline pH "cannot sufficiently protect Cu-based metal wirings from corrosion." In other words, Yokoi actually teaches away from the combination with Skee. It is improper to combine references where the references teach away from their combination. See, e.g., *In re Grasselli*, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983).

Further, following the combination of Skee and Yokoi, as proposed by the Examiner, what should be the pH of the final solution – acidic or basic? These are mutually exclusive pH regions. Importantly, the Examiner is reminded that cherry picking the disclosures of Skee and Yokoi in an attempt to re-create applicants' claimed invention is not allowed. Anything else would amount to hindsight reconstruction, which the courts have made clear is improper.

Accordingly, there is no objective motivation, teaching or suggestion to combine Skee and Yokoi as proposed by the Examiner.

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With regards to Moore, Moore teaches several corrosion inhibitors and chelating agents, including benzotriazoles and tolyltriazole, however, Moore does not cure the deficiencies of Skee. Specifically, Moore, and hence the combination of Skee and Moore, does not motivate, teach or suggest oxirane species and/or applicants' specifically enumerated chelators. Accordingly, two of the requirements needed to establish a *prima facie* case of obviousness have not been met.

In conclusion, Skee and the combination of Skee with En, Yokoi and Moore does not make obvious applicants' claim 1 and claims 2, 4-6, 10, 14-21, 23, 53-56, and 59 depending therefrom. Withdrawal of the rejection under §103 is respectfully requested.

Rejection under §102 in view of Carati

In the November 24, 2006 Office Action, claims 1-6 were rejected under 35 U.S.C. 102(b) as being anticipated by Carati et al. (U.S. Patent No. 5,908,968) (hereinafter Carati). Applicants traverse such rejection.

Carati relates to a process for the hydroisomerization of n-paraffins in the presence of a difunctional catalyst. Importantly, Carati does not relate in any way to the removal of photoresist or SARC materials from a substrate, as claimed by applicants herein.

Carati does disclose a composition including at least NaOH, tetraethylammonium hydroxide and boric acid, which is combined with other ingredients to produce a solid catalyst. That said, Carati does not expressly or inherently teach the use of applicants' oxirane species and/or the specifically enumerated chelators. According, Carati does not anticipate applicants' claim 1 or claims depending therefrom. Withdrawal of the rejection of claims 1-6 as being anticipated by Carati is respectfully requested.

Rejection under §102 in view of Miller

In the November 24, 2006 Office Action, claims 1-5 and 10 were rejected under 35 U.S.C. 102(a) as being anticipated by Miller et al. (U.S. Patent No. 6,572,743) (hereinafter Miller). Applicants traverse said rejection.

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Miller relates to an electrode assembly for electroplating conducting portions of nonconductors. Importantly, Miller does not relate in any way to the removal of photoresist or SARC materials from a substrate, as claimed by applicants herein.

Miller does teach a composition including KOH and ammonium hydroxide, however, Miller does not expressly or inherently teach the use of applicants' oxirane species and/or the specifically enumerated chelators. According, Miller does not anticipate applicants' claim 1 or claims depending therefrom. Withdrawal of the rejection of claims 1-5 and 10 as being anticipated by Miller is respectfully requested.

Conclusion

Claims 1, 2, 4-15, 17-23, 53-57 and 59 are in form and condition for allowance. If any additional issues remain, the Examiner is requested to contact the undersigned attorney at (919) 286-8090 to discuss same. Authorization is hereby given to charge any deficiency in applicable fees for this response to Deposit Account Number 13-4365 of Moore & Van Allen PLLC.

Respectfully submitted,

MOORE & VAN ALLEN PLLC

Date: February 26, 2007

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